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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/685,042	10/10/2000	Shuichi Kobayashi	35.G2657	3110
5514	7590	04/13/2005	EXAMINER	
FITZPATRICK CELLA HARPER & SCINTO			CHANG, AUDREY Y	
30 ROCKEFELLER PLAZA			ART UNIT	
NEW YORK, NY 10112			PAPER NUMBER	

2872

DATE MAILED: 04/13/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/685,042

Applicant(s)

KOBAYASHI, SHUICHI

Examiner

Audrey Y. Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 11 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1, 4, 17, 19 and 22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 4, 17, 19 and 22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Remark

- This Office Action is in response to applicant's amendment filed on February 11, 2005, which has been entered into the file.
- By this amendment, the applicant has amended claim 1, canceled claims 7 and 20 and has newly added claim 22.
- Claims 1, 4, 17, 19 and 22 remain pending in this application.
- The rejections to claim 1 and its dependent claims under 35 USC, first paragraph, set forth in the previous Office Action are withdrawn in response to applicant's amendment.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 4, 17, 19 and newly added claim 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over the patent issued to Mukai et al (PN. 6,052,234) in view of the patent issued to Ishii (PN. 6,157,488) and Ogata (PN. 6,097,547).

Claim 1 has been significantly amended which necessitates the new grounds of rejections.

Mukai et al teaches a *viewfinder optical system* having an objective optical system (tg, Figure 7) in front of a pupil (he) of the optical system, wherein the objective lens system comprises a double concave lens (g1), which is a *negative* lens, having a *diffractive* surface (s2) and a convex lens (g2), which is a *positive* lens, having a *diffractive* surface (s3), (please see Figure 7). Mukai et al teaches that

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the diffractive surface on the negative lens is having *negative power* and the diffractive surface on the positive lens is having *a positive power*, (please see column 6, lines 33-36), such that the first diffractive surface has a negative power and the second diffractive surface has a positive power. It is implicitly true that the second diffractive surface is *behind* the first diffractive surface since the incident light reaches the first diffractive surface first. The first diffractive surface will diverge the incident light toward the second diffractive surface as shown in Figure 7, the light incidents on the first lens at a non-zero incident angle will have its angle with respect to normal **reduced** by the first diffractive surface. With regard to the features concerning the “layered diffraction optical member laminated with a plurality of diffraction parts”, in light of the specification and the drawings 1B, 4B and 6B, it is understood that this phrase *means* that two diffraction parts are formed at *different* optical elements with the combination of the two elements serves as the “layered diffraction optical *member*”. With this interpretation, the objective lens system having the negative lens with the negative power diffraction surface and the positive lens with the positive power diffraction surface is considered to be the “layered diffraction optical *member*”, wherein the diffraction surfaces are *laminated* on the lens elements. As demonstrated by Figure 7, an image is formed on the image plane as the light passes through the layered diffraction grating parts.

Claim 1 has been amended to include the feature that the optical system further comprises an iris stop and a refractive optical system disposed at rear side of the iris stop. Mukai et al does teach that the optical system comprise other refractive lenses at rear side of the diffraction optical element, (such as g3, P and se in Figure 7, **with regard to newly added claim 22**), but it not teach such explicitly to include an iris stop. However it is very common practice in the art to use iris aperture stop an optical system as taught by **Ogata** wherein after diffractive optical elements, (in lens groups G1 and G2), an iris aperture stop and other refractive lens (such as G3 and G4) are included, (please see Figures 7-14) to regulate the amount the light entering the further refractive lenses. It would then have been obvious to one skilled in the art to add an iris aperture stop in front of the further refractive lenses of the optical

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system of Mukai et al for the benefit of regulating the amount of the light enters into the refractive lenses so that no stray light will enter to cause noise to the image formed.

This reference has met all the limitations of the claims with the exception that Mukai et al does not teach explicitly that the two diffractive optical elements are made with materials of different wavelength *dispersion property*. However Mukai et al does teach explicitly that by designing the diffractive optical surfaces or the diffraction grating parts having a ratio of the optical power to the Abbe number of the diffraction grating cancel the ratio for the refractive optical element, the diffraction grating parts can reduce the aberrations introduced by the refractive optical elements. This means the dispersion properties of the first and second diffraction parts can be designed to achieve such, (please see columns 7-8). Ishii in the same field of endeavor teaches a diffractive optical element having layered diffractive surfaces or parts that also has refractive power (please see Figures 22 and 23), wherein the diffractive surfaces are formed by using optical materials with different *dispersion* properties, (please see column 13, lines 33-54) in order to *achieve achromatic condition*, (i.e. reduce or eliminating the chromatic aberrations in the lens system). It would then have been obvious to one skilled in the art to apply the teachings of Ishii to modify the optical system of Mukai et al for the benefit of providing a design for the diffractive surfaces to more effectively achieve the achromatic condition and to reduce the aberrations given rise by the optical elements in the system.

With regard to the feature concerning that the optical system is an imaging optical system, Mukai et al teaches that the real image viewfinder optical system can be used in a camera, which is an imaging optical system, (please see column 1).

The lens system is designed to be a viewfinder that implicitly implied to be operated in the visible wavelength range. With regard to claim 4, Mukai et al teaches that an air space separation is between the two diffractive optical elements, (please see Figure 7).

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With regard to claim 17, Mukai et al does not teach explicitly that the diffractive surfaces are of blaze shapes. However diffractive lens having blaze shape is very well known in the art as demonstrated by the teachings of Ishii (Figure 6). Ishii also teaches that the orientation of the blaze shape may be opposite to each other, (please see Figure 31). It would then have been obvious to one skilled in the art to modify the diffractive surfaces of Mukai et al in accordance with the teachings of Ishii for the benefit of providing the diffractive surfaces with high diffraction efficiency.

With regard to claim 19, as shown in Figure 7 of Mukai et al, there is no lens present on the object side of the objective optical system (tg).

Response to Arguments

3. Applicant's arguments with respect to amended claims 1, 4, 17 and 19 and newly added claim 22, have been considered but are moot in view of the new ground(s) of rejection. Applicant's arguments are mainly drawn to the amendments to the claims and they have been fully addressed in the paragraphs above.

Conclusion

4. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

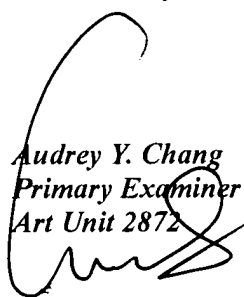
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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Audrey Y. Chang whose telephone number is 571-272-2309. The examiner can normally be reached on Monday-Friday (8:00-4:30), alternative Mondays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Drew Dunn can be reached on 571-272-2312. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Audrey Y. Chang
Primary Examiner
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A. Chang, Ph.D.